TUNING INSTRUCTIONS

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AMENDMENT RECORD SHEET

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TUNING INSTRUCTIONS

Contents

Introduction	Page 4
General	Page 4
Required Equipment	Page 4
Equipment Setup	Page 5
Equipment Setup For Tuning A Phone Without Removing Covers	Page 6
Equipment Setup For Tuning A Phone With Removing Covers	Page 7
Starting The Program	Page 8
Starting Options for Service Software	Page 8
Tuning Steps	Page 9
Initialize Local Mode	Page 9
Battery Reference	Page 9
Reference Charge Voltage	Page 9
VCO	Page 10
VCXO	Page 10
TX Power Level Tuning	Page 11
Deviation Tuning	Page 12
RSSI Reference Value	Page 13
Tuning Values	Page 13

Introduction

General

In contrast to earlier second–generation analog cellular phones tuning operations of the NHA–2 are carried out using the PCLocals software. The PCLocals program turns the phone into the Locals mode, in which the phone can be outwardly controlled via the M2BUS interface.

Tuning is based on the PCLocals software communicating with the D/A and A/D converters of the phone.

The calibration data of the phone resides on the EEPROM. The contents of the EEPROM can be read by the PCLocals software. The program also enables writing of the factory preset calibration data to the EEPROM, after which the whole tuning process should be carried out.

If a repair has been carried out on the RF section of a system module then the appropriate tunings should be performed as described in the following section and using the on–screen help menus as a guide. Spare system modules will be delivered pre–tuned from the factory and will not require re–tuning.

N.B. **During tuning, proceed as follows:**

- Take care not to damage sensitive measuring instruments with excessive RF power.
- Carry out all tuning steps in the shortest possible time to avoid excessive heating of RF units.
- Perform all tuning steps in the order presented.
- Never try to mask a fault by tuning it out!

Required Equipment

- PC/AT computer with PCLocals software; see Sect. PCLocals intructions on installation and use.
- M2BUS adapter DAU–2 and other service accessories; see equipment set-up pictures.
- Audio analyzer
- RF power meter, power measurement sensitivity –10 dBm.
- RF generator
- Device to provide specified testmodulation to modulate RF generator.
- Multimeter or DVM.
- Attenuator and branching unit.
- Power supply, nom. voltage 12 V.

Equipment Setup

Caution: Make sure that you have switched off the PC and the printer before making connections !

Caution: Do not connect the PKD–1 key to the serial port. You may damage your PKD–1 !

Attach the protection key PKD–1 to parallel port one (25–pin female D–connector) of the PC. When connecting the PKD–1 to the parallel port be sure that you insert the PC end of the PKD–1 to the PC (male side). If you use a printer on parallel port one, place the PKD–1 between the PC and your printer cable.

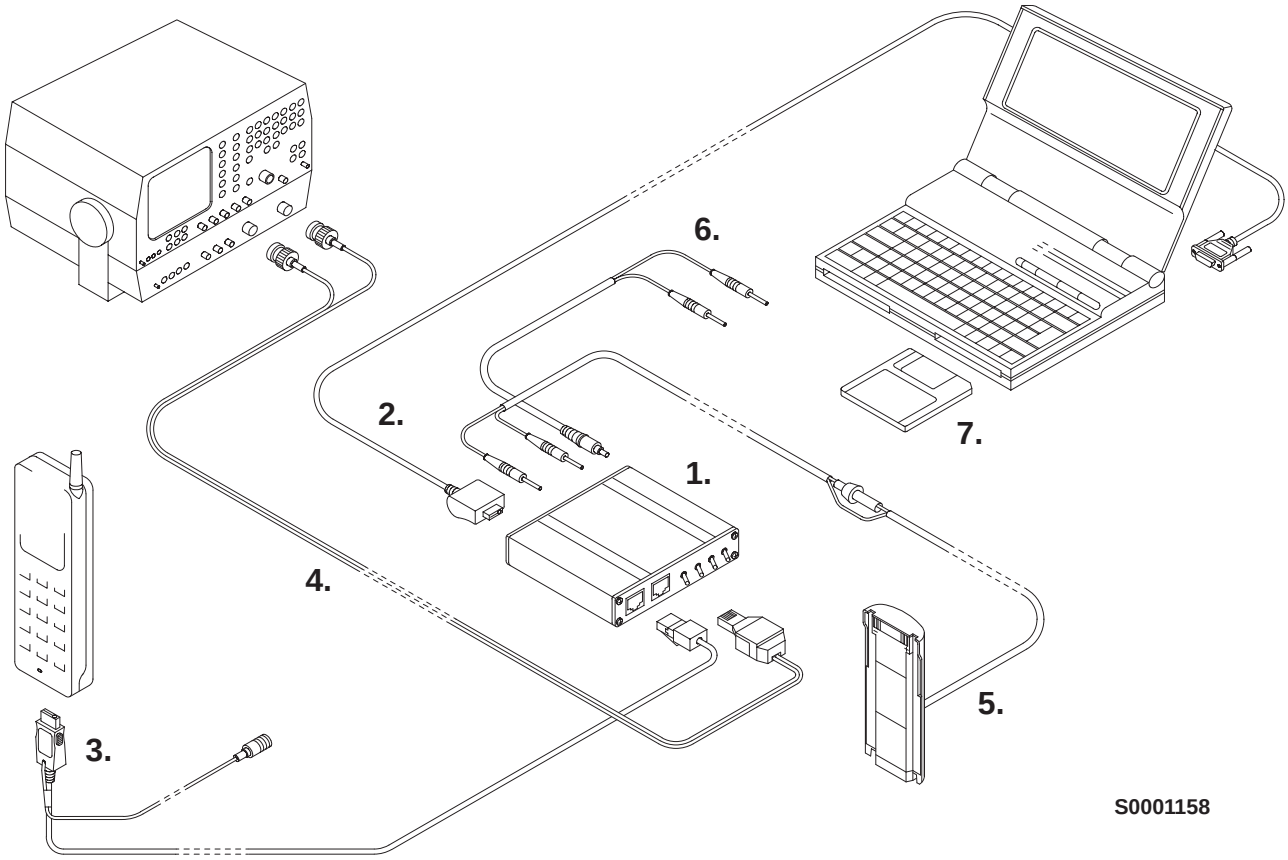
Next connect the M2BUS service cable, DAU–4S, to the serial port (RS–232) of the computer. Attach one end of the service cable to the PC serial port and the other end to the service box, JBU–4. For servicing the phone with the covers in place the service box should always be used.

The RF cable should be connected between the RF connector of the test set and the appropriate connector on JBU–4. When the phone covers are removed the RF connection on the extension cable should be used instead.

For audio measurements connect the service cable, SCS–4, as follows:

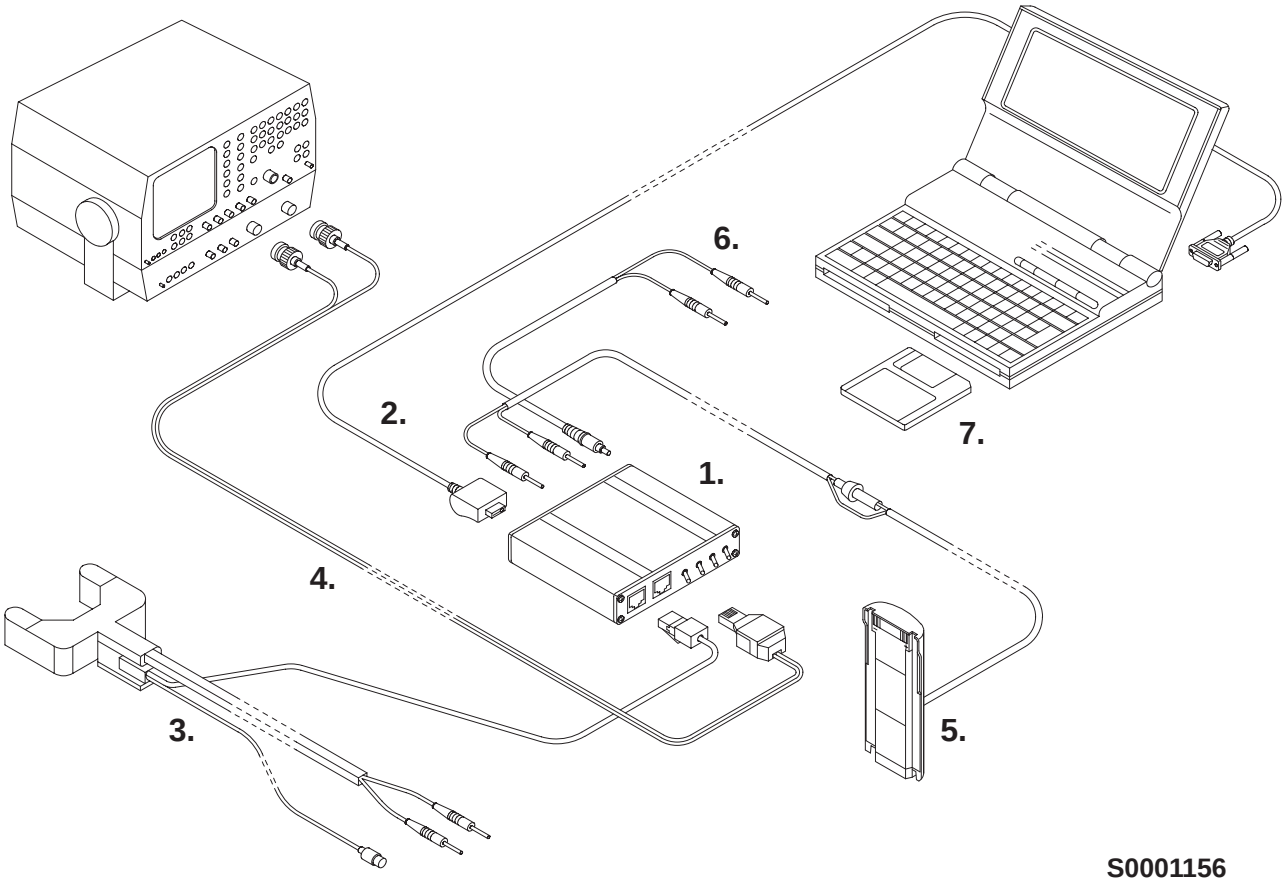
– EAR line to AF INPUT of test equipment
– MIC line to MOD GEN OUTPUT of test equipment

Equipment Setup For Tuning A Phone Without Removing Covers



Item:	Service accessory:	Product code:
1.	Service box, JBU–4	0770041
2.	M2BUS adapter cable, DAU–4S	0730057
3.	Service cable, SCS–4	0730052
4.	Audio cable, ADS–1	0730011
5.	Dummy battery, BTA–1	0770038
6.	Power connector, PCS–1	0730012
7.	Service software diskette 3.5”,	0193697
–	Service software diskette 5.1/4”	0193698
–	Software protection key PKD–1 ”dongle”	0750018
–	Antenna cable, ATT–1	0310009

Equipment Setup For Tuning A Phone With Removing Covers



S0001156

Item:	Service accessory:	Product code:
1.	Service box, JBU–4	0770041
2.	M2BUS adapter cable, DAU–4S	0730057
3.	Test frame, JBA–1	0770037
4.	Audio cable, ADS–1	0730011
5.	Dummy battery, BTA–1	0770038
6.	Power connector, PCS–1	0730012
7.	Service software diskette 3.5”,	0193697
–	Service software diskette 5.1/4”	0193698
–	Software protection key PKD–1 ”dongle”	0750018
–	Test Adapter, ATM–1	0310013

Starting The Program

The program is delivered on a diskette and is copy protected with a dongle. The program can also be installed on the hard disk, which is recommendable to obtain a maximum data access rate. In case you want to store the program to the hard disk, proceed according to instructions given in service software installation manual.

The program is started with the command:

NHA2SERV <Enter> (or **PCLSTART** <Enter>)

The program can be set up work with different serial ports or display types.

Starting Options for Service Software

The program is started by entering the following command:

NHA2SERV

For more information about how to operate the service software, refer to booklet Service Software Instructions.

Note: Type *NHA2SERV /? + Enter* if you want see all starting otions.

Tuning Steps

Initialize Local Mode

This command reactivates the locals mode of the phone.

Local Mode Activation

– Select option 1 from the Tuning menu
– The text ” Local Mode ” will appear in the phone display

Battery Reference

This consists of tuning the reference value for the battery.

Tuning Procedure

– Select Tuning / Battery Reference
– Connect 4.8 V to battery connector. Press *Enter*.
– The program displays the reference value stored in the phone together with the value read from the A/D converter. The A/D value can be re–read by pressing the spacebar.
– Enter new value to EEPROM by pressing *Enter* on the keyboard or clicking on the corresponding button with the mouse.

Reference Charge Voltage

This consists of tuning the reference charge voltage.

Tuning Procedure

– Select Tuning / Reference Charge Voltage
– Connect 4.8 V to VCHARG connector. Press *Enter*.
– The program displays the reference value stored in the phone together with the value read from the A/D convertor. The A/D value can be re–read by pressing the spacebar.
– Enter new value to EEPROM by pressing *Enter* on the keyboard or clicking on the corresponding button with the mouse.

VCO

This command is used to tune the VCO of the phone.

Tuning Procedure

– Ensure that shield and display is installed.
– Select Tuning / VCO
– The command tunes automatically VCO. When VCO is tuned it asks if the new tune factor will be saved to phone.
– Press *Enter* to save value to phone.

VCXO

This command is used to tune the VCXO frequency of the phone.

*Note ! VCXO tuning is used **ONLY** if VCXO is changed.*

Tuning Procedure

– Select Tuning / VCXO
– Write existing tuning code to the paper enclosed with the new VCXO.
– Read new tuning number from the same paper, and write it on the line of VCXO tuning menu.
– Press *Enter* to save value to phone.

TX Power Level Tuning

This command is used to tune the phone's TX power levels. When selected, the transmitter will be switched on at power level 7 on Channel 380 ±50.

Tuning Procedure

– Connect power meter to the phone's antenna connector via antenna cable

– Select Tuning / TX Power Level Tuning

– To tune a Power Level select the level you wish to tune from the list. The target value will appear to the left of the cursor. Use the *Coarse* and *Fine* buttons until the target value is reached. Recommended tuning order 7 –> 0.

Channel	**Power level**	**Power level of band 1 dBm**	**Example value D/A converter**
mid high	7 7	6.8 ±0.8 (4.78 mW) 6.8 ±0.8 (4.78 mW)	67 67
mid high	6 6	10.8 ±0.5 (12.0 mW) 10.8 ±0.5 (12.0 mW)	72 72
mid high	5 5	14.8 ±0.5 (30.1 mW) 14.8 ±0.5 (30.1 mW)	80 80
mid high	4 4	18.8 ±0.4 (75.8 mW) 18.8 ±0.4 (75.8 mW)	92 92
mid high	3 3	22.8 ±0.4 (190 mW) 22.8 ±0.4 (190 mW)	110 110
mid high	0,1,2 0,1,2	26.8 ±0.3 (479 mW) 26.3 ±0.3 (427 mW)	124 124

– Enter new values to EEPROM using *Enter*.

Deviation Tuning

A number of deviation tunings are grouped together in this command. They **must be** tuned in the order ST, Maximum, Nominal.

Tuning Procedure

– Select Tuning / Deviation Tuning

– Select Signal Tone Deviation Tuning to move cursor and show the relevant on–screen information for that particular tuning parameter

– Adjust deviation to 8 kHz ±350 Hz by changing D/A converter value by *Coarse* and *Fine* buttons.

– Once deviation is correct, press ↓ key.

– When ↓ is pressed, the value is saved to EEPROM and Maximum deviation tuning is started.

– Use external low–frequency generator to feed a frequency of 2.3 kHz/1 V to XMIC connector.

– Adjust maximum deviation to 10.4 kHz by changing D/A converter value by *Coarse* and *Fine* buttons.

– Once deviation is correct, press ↓ key.

– When ↓ is pressed, the value is saved to EEPROM and Nominal Deviation Tuning is started.

– Use external low–frequency generator to feed a frequency of 1 kHz/60 mV to XMIC connector.

– Adjust nominal deviation to 2.9 kHz ±100 Hz by changing D/A converter value by *Coarse* and *Fine* buttons.

– Enter new value to EEPROM by pressing *Enter* on the keyboard or clicking on the corresponding button with the mouse.

RSSI Reference Value

This consists of tuning the reference value for the RSSI meter. It is carried out without an external signal using noise.

Tuning Procedure

– Select Tuning / RSSI Reference Value
– Disconnect RX signal from the phone's external antenna connector and press *Enter*.
– The program displays the reference value stored in the phone together with the value read from the A/D converter. The A/D value can be re–read by pressing the *Spacebar*.
– Enter new value to EEPROM by pressing *Enter* on the keyboard or clicking on the corresponding button with the mouse.

Tuning Values

With this command you can save the read Tuning Data from the EEPROM and save factory default tuning values to phone. You can read/save those values from/to file as well.

Use *PgUp*/*PgDown* keys to print pages of EEPROM values to screen.

Use Default button to save factory default tuning values to EEPROM.

Note! Default doesn't contain VCXO values.

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